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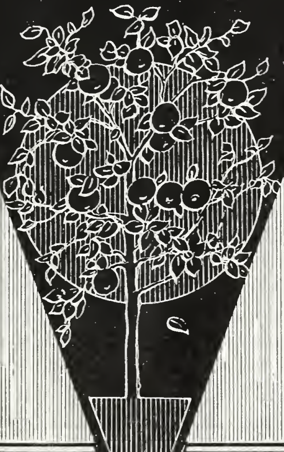
DWARF FRUITS



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DWARF FRUITS

By H. P. Gould, *principal horticulturist, in charge, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry*

Interest in dwarf fruits is widespread. Many inquiries are made about their adaptability to different conditions and their range of usefulness. No attempt is made in this discussion to arrive at a conclusion as to the proper place, economically, of dwarf-fruit growing under American conditions. The amateur obviously can take chances that would be unwise for a commercial grower to take, and for the one who enjoys working with plants and the endeavor to make them do his will, there is doubtless a source of much pleasure in dwarf-fruit culture. It is perhaps equally obvious that from a commercial standpoint dwarf-fruit growing is more for the specialist than for the general grower.

What Are Dwarf Fruits?

A dwarf fruit tree, as the term is generally used in this country, is produced by using some kind of rootstock that inherently makes a small growth and that restricts in a more or less corresponding manner the growth of a scion or a bud of another kind or variety of fruit "worked" on it. Thus, in producing dwarf apple trees, the propagator uses Doucin or Paradise stocks. These are merely very small growing varieties of apple, which are themselves usually propagated by mound layering. Hence the stocks, being propagated vegetatively, are on their own roots.

In propagating, the practice is sometimes followed of placing the stronger-growing varieties on Paradise stocks, and the weaker ones on the Doucin. This may be governed in particular cases, however, by the wish of the grower with respect to the size of the trees to be produced.

Quince roots, generally of the Angers variety, are used in producing dwarf pear trees. The Angers quince propagates quite readily by mound layering; many varieties of pears make good unions with it, and it grows well. However, some varieties of pears, if grown as dwarfs, must be double-worked, because they lack congeniality with the quince and hence do not make good unions with it. Double working consists, first, in budding on the quince stock a pear variety that makes a good union with it; then later, after the pear bud has developed a shoot, it is budded or grafted to the desired pear variety, which would not grow well directly on the quince stock.

Peach, nectarine, plum, apricot, and sour cherry trees, as ordinarily grown, are small when compared with well-developed standard apple and pear trees. Moreover, the trees of these stone fruits mature more rapidly and come into bearing at an earlier age than do most apple and pear trees; hence, there are fewer reasons for propagating them on dwarfing stocks. Furthermore, by proper pruning, the tree growth of the stone fruits can be considerably restricted. However, a very few nurserymen are interested in producing dwarf peach, plum, and cherry trees on a limited scale. The western sand cherry (*Prunus besseyi*) is commonly used as a dwarfing stock for these fruits; also most of the native plum species will dwarf the peach. The mahaleb cherry, which is the stock used most extensively in propagating the cherry, has a slight tendency to dwarf trees growing on it.

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The Place of Dwarf Fruits in American Pomology

Dwarf apple and pear trees have long been grown in the United States but only in a limited way. Few commercial orchards of dwarf apples have ever been planted in this country; and dwarf pears have not been planted extensively.

In Europe dwarf fruits are grown somewhat extensively. They are often trained in various ways practically unknown in this country. Peach and nectarine trees are commonly trained against walls, the pruning and training which they receive accounting for their dwarf stature rather than the stocks on which they are propagated.

The suitability of dwarf apple and pear trees for the garden, for planting about buildings, or even for the home orchard is perhaps unquestioned. It is possible that they could be so used, and with satisfaction to the planter, much more commonly than is being done. But the place of dwarf fruits in a commercial orchard is quite a different matter. Opinion, if freely expressed, would unquestionably be somewhat varied, for actual knowledge based on experience under American conditions is too limited to sustain conclusions as final. Part of that experience is favorable, while part of it is adverse from the standpoint of commercial fruit growing. In years past there have been a few commercial dwarf pear orchards that were rather outstanding in their success. A very limited number of apple growers are convinced, as a result of their experience, that dwarf apples, under certain conditions, are a valuable asset in commercial orcharding. One such grower, located in the Hudson Valley in New York, had dwarf apple trees interplanted between standard trees placed 40 feet apart each way. He experienced serious difficulties with the first plantings of dwarf trees but overcame them in his later plantings to an extent that made the results highly satisfactory. Another grower advocating dwarf fruits is located in northern Ohio. He is primarily interested in peaches but finds that dwarf apple and pear trees fit in well with peach trees as to the spacing required, the equipment needed, and in other respects. He has been growing dwarf apples for many years and dwarf pears for a considerable period. His appraisal of these fruits is substantially as follows:

> Our experience is based on 260 dwarf pear trees, mostly Bartlett and Angouleme (*Duchess*), and 360 dwarf apple trees planted between 1910 and 1925. The apple varieties include Baldwin, Stayman Winesap, Grimes Golden, Rhode Island Greening, and the fall varieties, Maiden Blush, Oldenburg, and Wealthy. If we were setting them over we would put in more Stayman Winesap, and fewer Baldwin and Oldenburg. Of course we see many beautiful orchards of the standard apple trees, and have no objection to them whatever, but we prefer the lower-growing dwarfs, and any further plantings of either pear or apple will be of the dwarfs.

In addition to the experience of amateur and commercial fruit growers, several experiment stations have carried on investigations with dwarf fruits, especially apples.

The advantages claimed for dwarf trees contrasted with standard trees are earlier bearing; greater convenience in caring for them (such as spraying and pruning) and in harvesting the fruit; finer, more highly colored and better-developed fruits; and yields commensurate with standard trees, because of closer planting and consequently the larger number of trees planted on a given area. From the home-garden standpoint, there is also the better adaptability of small trees to a restricted area, and the convenience of easily providing a relatively large number of varieties in such an area if desired, this advantage being obviously a corollary of the smaller size and closer spacing of the trees as compared with standard trees.

The manner in which these claims have been sustained in different instances constitutes the chief basis for difference of opinion as to the merits of dwarf trees. Not all the results have been as favorable as those secured by the Hudson Valley and Ohio growers. Dwarf apple trees have not come into bearing earlier, nor have they yielded proportionately with standard trees in all cases, nor has the fruit regularly been finer, larger, or more attractively finished than that borne by other trees. Furthermore, in some instances the root systems have been shallow, and the trees have blown over badly when the soil was wet, whereas under the same conditions standard trees have been unaffected. Sometimes the roots of dwarf apple trees have suckered badly; there has been wide variation in the hardiness of the roots; and winter injury has been more serious than with standard trees. Moreover. it is conceded that drawf-fruit culture is a more intensive type of fruit growing than the handling of standard trees and that it requires more care and attention in some particulars.

On the other hand, as already indicated, there is experience which as a whole is highly favorable to dwarf trees, particularly apples and pears. This suggests that the difference in results may be more or less due to factors not inherent in the trees themselves. That this may be true in part, at least as to apples, is indicated to some extent by studies carried on at the East Malling Research Station, East Malling, Kent, England, which have developed evidence that the stocks formerly in common use in propagating dwarf trees have represented many different types and forms, each one differing in its merits and in its influence on the trees growing on it. Some 15 or 16 distinct types of Paradise and Doucin stocks have been segregated, and the influence of each on the scion has been determined. It is believed that with the greater knowledge of these stocks that has been gained from the investigations and by the use only of those stocks that have been shown to possess high merit along given lines, the results from dwarf apples may be very different in the future from some of those experienced in earlier years.

The view is expressed in one of the reports of the East Malling Station, in substance, that by the use of properly selected stocks, dwarf apple trees may now be planted with assurance as to the type of trees expected without having to fall back on the hope, merely, that it may prove to be what was desired. The selection of stocks for trees or bushes of different vigor suggested by that station is as follows:

Very dwarfing stock.—The Jaune de Metz Paradise (Malling No. IX) "suitable for very quick cropping bush trees on good land, cordons and trained trees in small gardens."

Semidwarfing stock.—The Doucin (Malling No. II) "suitable for moderate sized quick cropping bush or trained trees, except for weak growing scions."

Vigorous stock.—Broadleaved "English" Paradise (Malling No. I) "suitable for bushes of the weaker growing sorts, large permanent bushes, and even moderate-sized, half-standard trees."

Planting and Care of Dwarf Fruit Trees

Dwarf fruit trees are planted and cared for in substantially the same manner as are standard trees. Such differences as need to be observed are mainly matters of detail, not of principle.

Planting Distance Between Trees and Depth of Planting

In planting dwarfs, spacing the trees is as important as it is with standard trees. However, no uniform practice prevails. Some advise placing the trees 12 to 15 feet apart each way for the more dwarfing stocks and 15 to 18 feet up to 20 by 20 each way for trees on the stronger-growing stocks. Where both stocks are used, trees on the more vigorous growing stocks are sometimes set 27 by 27 feet, with those on the more dwarfing stocks interplanted; or 25 by 30 feet, interplanted one way. These are somewhat greater planting distances than prevail in European practice, in fact, greater than is commonly advised in this country, but it is possible that the trees make a larger growth under American than they do under European conditions. Probably for dwarf pear trees 18 or 20 feet apart each way would be satisfactory planting distances.

In planting the trees, deeper setting than is usually advised appears to eliminate some of the troubles often experienced. One of the commercial growers of dwarf apples previously mentioned (p. 3), found that setting the trees deep enough so that the point of union between the stock and the variety was at least 4 inches below the surface of the ground gave them sufficient stability to prevent blowing over; the roots largely escaped winter injury; they also escaped injury from tillage implements; and, as a corollary, the roots suckered little or none, suckering rarely occurring in the absence of mechanical injury to the roots.

An undesirable result of deep planting may be the development of roots just above the union at the base of the variety, thus producing in part a self-rooted tree. Such roots, if permitted to remain, would stimulate unduly the growth of the tree, eventually overcoming the dwarfing effect of the original root system. While the development of such roots probably occurs less often than some have supposed, an examination of the trees occasionally by removing the soil from about the base, and severing scion roots if found, is easily accomplished and is doubtless advisable.

Pruning and Training

Pruning and training are two quite distinct operations, though closely related. Pruning consists, in the final analysis, of removing certain parts of the tree. Training is making a tree or other plant, or parts thereof, take some particular position or develop some particular form or shape. Training is usually aided by pruning with the type of training that is to be followed especially in view. Grapevines, for example, are pruned and then trained on a trellis, the pruning being determined largely by the type of trellis, and therefore the system of training, that is to be used.

PRUNING AT TIME OF PLANTING

Dwarf apple and pear trees are usually at least 2 years old when planted. Such trees are well-branched as is the case with standard trees of the same age.

As generally done in this country, pruning dwarf trees at the time of planting takes substantially the same course as with standard trees. The trees usually are grown in bush or "tree" form, which is more or less comparable to the open-center type of standard tree.

Likewise, the pyramidal dwarf differs little in its principal features from the central-leader type of standard tree so far as early shaping is concerned.

Dwarf fruit trees are headed very low, 12 to 18 inches from the ground being the usual range of distance for the tree form. For the bush form, the head is started practically at the ground.

In Europe other forms of dwarf trees are commonly seen. They are grown and trained fan- or palmette-shape against walls, especially peaches and nectarines; they are also grown as cordons and espaliers. The method by which a tree is to be trained must be taken into account when it is pruned and shaped at the time it is planted. A tree to be trained fan-shape is started when planted substantially the same as one to be grown in bush form, except that special attention is given to the side branches, as contrasted with those that are on the face next the wall and those on the outer face of the tree. The palmette is likewise substantially a central-leader tree trained against a wall. The cordon is started with the tree as a single straight unbranched stem. An espalier is literally a trellis, and a tree trained on a trellis is also spoken of as an espalier. The form of trellis to which a tree is to be trained will determine the pruning to be given it when planted.

LATER PRUNING

In this country, very little training of dwarf trees is done. They are usually grown, as previously stated, in tree form and are allowed to develop their natural shape as would standard trees of the same varieties. In such case, the dormant pruning is much the same as that of standard trees. The tops are kept open through the removal of superfluous branches, the limbs that cross are cut out, and in other respects the general directions for pruning standards apply also to dwarfs. There is perhaps this difference, however: more careful attention should be given to individual limbs and in many cases to individual fruit spurs and the limbs should be headed back rather heavily from time to time if the maximum dwarfing effect is desired. The first direct influence of pruning is normally local in its effect and is exerted near the point where a cut is made. If a branch or twig is cut off, the most pronounced effect is in the growth of the shoot that develops from a bud or buds immediately below the point where the branch was cut off. In like manner, the skillful pruning of fruit spurs may be used to gain particular results.

Obviously the pruning of espaliers and cordons, as well as trees trained against walls, requires much attention and very close observance of details. In order to keep the trees perfectly balanced and capable of producing maximum quantities of fruit, every twig and fruit spur requires individual attention. The suppression by pinching back the growth that is too vigorous and the careful safeguarding of that which is too weak are matters that call for constant vigilance on the part of the grower. The bending down of branches that are growing too fast to preserve a balance will sometimes accomplish good results by checking the free movement of the sap which, in turn, tends to stimulate the formation of fruit buds. Within certain limits the timely checking of the sap by pinching back the growing shoots will tend to less wood and more fruit-bud development.

The desired end, so far as it is attainable by pruning, can be accomplished only when the grower has learned by much experience just the treatment to give every individual fruit spur or bud and shoot. He can learn without undue effort the general underlying principles, but only by a critical study of the effect of what he does can he learn the real application of the principles.

In the limited literature on dwarf fruits, frequent reference is made to summer pruning, pinching back of growth, and other repressive measures, but these relate more particularly to espaliers, cordons, and other specially trained trees that require more or less constant attention to details of pruning and training during the growing season.

TRAINING

Training, as distinguished from pruning, has to do with placing the branches or canes in certain positions, or inducing them to take particular forms as they develop. These forms (espalier, cordon, and others) have been enumerated (p. 5).

A garden fence may be used as the trellis on which an espalier is trained. The cordon is a dwarf fruit tree grown to a single stem, with its side branches so restricted and controlled that they form only short spurs or shoots. The tree may be a horizontal, an oblique, or an upright cordon, depending on the position in which it is trained. A stake or a very simple trellis of one wire or a rod will be necessary to hold the cordon in the desired position, at least while it is small.

Dwarf fruit trees may also be trained fan-shape and grown against a wall. This method is used more or less in England, rarely in this country. The heat absorbed by a wall against which the tree is trained may aid materially in the protection and in the development of both the tree and its fruit. This is more advantageous in the climate of England than in this country. In fact, in the intense sunlight in some sections here, the heat and the reflection of the sun might be sufficient to prove disastrous to trees trained against a wall.

These special forms, espalier, cordon, double cordon, fan-shape or palmette, are employed so rarely in this country, and they fit into the American ideals to so limited an extent, that further details of procedure in handling are deemed unnecessary. As noted previously, the bush or tree and pyramid forms meet American conditions better than the other forms.

Cultural Practices

The usual practices of tillage, fertilizing, and spraying recommended for the best-managed orchards of standard trees apply also to dwarf trees. The maintenance activities, however, should be more intensive than those applied to the average orchard, particularly with respect to keeping the soil in a highly productive condition. Important as this feature is in any type of fruit growing, dwarf trees are perhaps more certain to suffer severely under any conditions of neglect than are standard trees.

Varieties

The fruit-variety problem is inherently a large problem from whatever standpoint it is viewed. It is increasingly so in some respects when dwarf fruits are concerned because not all varieties unite well with the dwarfing stocks. This is true especially of some pears, and, as noted on page 2, double working is resorted to in such cases.

The number of dwarf apple and pear varieties listed by nurserymen is now much smaller than it formerly was. The principal varieties of apples available are: Baldwin, Cortland, Delicious, Early McIntosh, Golden Sweet, Grimes Golden, Maiden Blush, McIntosh, Northern Spy, Oldenburg, Pound Sweet, Red Astrachan, Red Spy, Rhode Island Greening, Rome Beauty, Stayman Winesap, Wealthy, Winter Banana, and Yellow Transparent.

Perhaps one of the most satisfactory varieties grown as a dwarf in the Hudson Valley is Cox Orange. It is a choice dessert apple and one of the few English sorts that reaches a high degree of perfection in this country. However, it is very difficult to find it either as a dwarf or standard tree in any American nursery. By some, the McIntosh is considered one of the best of the more common varieties for dwarfing.

The principal varieties of pears available are: Angouleme (*Duchess*), Anjou, Bartlett, Clapp Favorite, Kieffer, and Seckel.

Experience differs with respect to the Bartlett making a lasting union with the quince understock. In some cases it appears to require double working. Some nurserymen find Beurre Hardy an excellent variety for this purpose as it makes a strong union with the quince stock, grows well, and is congenial with other varieties when they are budded on it.

Age of Bearing and Yield of Dwarf Apple Trees

Considerable variation in the age at which dwarf apple trees have come into bearing has been experienced in this country. Early bearing is, of course, one of the appealing claims commonly made for this type of tree.

Some growers have failed to secure production appreciably earlier than with standard trees, and the yield has been especially disappointing. Others report the beginning of bearing at just about one-half the age at which standard trees of the same varieties commence.

Yields have been equally varied and disappointing in some cases. Reliable records of production in individual cases show a yield of dwarf Northern Spy trees of 5 bushels at 9 years of age; Red Astrachan, 9 bushels at 15 years of age. These records, however, are much above average yields.

Thinning the Fruit

Many of the best growers of standard fruits appreciate the necessity for thinning fruit from overloaded trees if the highest-grade product is to be grown. This operation is doubly important with dwarf fruits, especially in the case of such forms of training as the cordon and espalier, where, as a result of special pruning methods, an abnormally large proportion of the growth is composed of fruit spurs. If these are permitted to overbear, which they tend strongly to do, the desired ends will be largely defeated.

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